Astronomy Reports 2012 vol.56 N12, pages 966-983

Solution of the kinematic equation for near-parabolic keplerian motion: Convergence of the series

Sannikova T., Sudov L., Kholshevnikov K.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In ephemeridical astronomy, an important role is played by the kinematic equation relating time and position in the orbit. Since the ephemerides have already been calculated for many hundreds of thousands of celestial bodies moving along more or less known orbits, close to optimal algorithms for solving this equation are required. We consider the case of near-parabolic motion, for which Euler found an elegant form for the kinematic equation, to be insufficiently thoroughly studied. Earlier, we presented a solution of this equation using a series in powers of the small parameter introduced by Euler with timedependent coefficients. In the current study, we find the region of convergence of this series. © 2012 Pleiades Publishing, Ltd.

http://dx.doi.org/10.1134/S1063772912120037